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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/471,460	12/22/1999	Thomas A Figura	94-0280.03	7429

21186 7590 02/14/2007  
SCHWEGMAN, LUNDBERG, WOESSNER & KLUTH, P.A.  
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MINNEAPOLIS, MN 55402

EXAMINER
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LEE, CALVIN

ART UNIT	PAPER NUMBER
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2818

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/14/2007	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

**Office Action Summary**

Application No.

09/471,460

Applicant(s)

FIGURA et al.

Examiner

Lee, Calvin

Art Unit

2818

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 31 January 2007 (Withdrawn from Issue).
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 45-58 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 45-58 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 1999 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☐ Notice of References Cited (PTO-892)                      4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)                      5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_                      6) ☐ Other: \_\_\_\_\_

## OFFICE ACTION

### *Reason for Reexamination*

1. The above-identified application is withdrawn from issue due to unpatentability of its pending claims. See 37 CFR § 1.313(b)(3).

### *Specification*

2. The disclosure is objected to under 37 CFR 1.71, as being so incomprehensible as to preclude a reasonable search of the prior art by the examiner.

For example, the following items are not understood:

Claim 45 requires that “a material” be deposited in a site, and simultaneously be etched from the site. The specification does not support this claim. The third embodiment alternatively discloses depositing an etch resistant material **80** while simultaneously etching the protruding portions of underlying conductive layer **20**. But nothing in the specification discusses the simultaneous deposition and removal of the same material.

Applicant is required to submit an amendment, which clarifies the disclosure so that the examiner may make a proper comparison of the invention with the prior art.

### *Claim Rejections - 35 U.S.C. § 112*

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make & use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 45-47, and 54-57 are rejected under 112, 1<sup>st</sup> paragraph for lack of enablement. One of ordinary skill would not be reasonable applying of how to deposit a material while simultaneously etching it, and the specification does not reasonably explain how to perform these acts simultaneously.

5. Claims 48-53 and 58 are rejected under 35 USC 112, 1<sup>st</sup> paragraph, as failing to comply with the written description requirement. The claims contain subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention

The invention's third embodiment discloses, "an etch resistant layer **80** can be formed within the contact **14** while, simultaneously, the conductive layer **20** is etched ..." Nowhere in the disclosure teaches or suggests etching a conductive material and/or said material (i.e., the etch resistance layer) simultaneously with performing said deposition [of the resistance layer **80**].

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

7. Claims 45-46 and 48 are rejected under 112, 2<sup>nd</sup> paragraph for indefiniteness. The claim recites a deposition "in said site," and etching said material "in said same general site,"... "generally simultaneously..." It is unclear how the term "general" is intended to modify either of the terms, "site" and "simultaneously," and one of ordinary skill in the art would not be reasonably apprised of the scope of claim protection intended.

#### ***Claim Rejections - 35 U.S.C. § 103***

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claims 45-47, 54 and 56-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Guldi et al* (US 6,267,122) in view of *Marks et al* (US 5,204,288).

*Guldi et al* discloses a method of providing a material over a wafer, comprising of:

- performing a deposition of a material **112** in a site over the wafer [Fig. 2], wherein the step of performing a deposition further comprises depositing a polymer on the wafer [Fig. 3C];
- plasma etching the oxide material in the same general site used to perform the deposition of the oxide material [col. 6, ln.15], wherein the step of etching further comprises etching generally simultaneously with performing the deposition of the polymer [col. 2, ln.60].

*Guldi et al*, in other words, discloses openings or “sites” in photoresist 110 [Figs 1-3], which are between underlying metal features or vias 108 (one of which is depicted). The etching of aluminum layer or “material” 106 is performed generally simultaneously with the deposition of Al-based sidewall residue or Al “material” 112. Sidewall residue --as it's name explains-- deposits at a greater rate within the site than above the tungsten via 108.

a) In re claims 45-46, *Guldi et al* does not explicitly teach or suggest, “deposition occurs at a greater rate within the site than above the features.”

It would have been obvious to one having ordinary skills in the art to have modified the deposition rate of *Guldi et al* by utilizing the claimed deposition rate because one would adjust either source power or gas flow rate to result in the desired deposition rate of the polymer layer.

*Guldi et al* teaches providing material 112 by the site of metal feature(s) 106 (reads on claim 47), but not within a site of the metal features. Nevertheless, such material in a site between metal features is known in semiconductor process art as evidenced by *Marks* disclosing the same method of providing a material 20b within site between metal features 14, 15 on wafer 10 [Fig. 9].

It would have been obvious to one with ordinary skill in the art to modify the process of *Guldi et al* by utilizing a material in a site between metal features for the purpose of providing an etch resistance layer within the site being etched in a subsequent removal of the material, thereby avoiding an over-etch of the semiconductor material surrounding the site.

b) In re claim 54, none of the cited arts suggests the layer's thickness. The application disclosure suggests “These settings usually cause the etch resistant layer formed on the surface to be thinner than the material formed within the contact. It should be noted that there is an interaction between the listed parameters, and other settings in addition to the ranges listed above may also function adequately. The setting here can be altered by one of ordinary skill in the art from the description herein to customize the etch resistant layer formation for various sizes and shapes of contact, and for various thicknesses within the contact and over the wafer surface. Depending on the application, any thickness of etch-resistant layer may be useful, but an etch-resistant layer 50Å or greater is preferred for most applications.” Again, it's a matter of choice.

***Contact Information***

10. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896 on Mondays thru Thursdays 6:30-4:30PM. If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2818's Supervisory Patent Examiner *Minsun Harvey* can be reached at (571) 272-1835. The fax phone number is (571) 273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAG or Public PAIR. For more information about the PAIR system, see <http://pair-direct.uspto.gov> Should you have questions on access to the PAG system, contact the Electronic Business Center (EBC) at 1-866-217-9197.

Dated: February 7, 2007



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Calvin Lee